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CENTRAL INTELLIGENCE AGENCY REPORT

INFORMATION FROM
FOREIGN DOCUMENTS OR RADIO BROADCASTS CD NO.

50X1-HUM

COUNTRY USSR

DATE OF
INFORMATION 1950SUBJECT Scientific - Electricity, industrial
power equipmentHOW
PUBLISHED Monthly periodical

DATE DIST. 30 Nov 1950

WHERE
PUBLISHED Moscow

NO. OF PAGES 3

DATE
PUBLISHED Feb 1950

LANGUAGE Russian

SUPPLEMENT TO
REPORT NO.

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SOURCE Promyshlennaya Energetika, No 2, 1950 pp 1-3,

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THE NEED FOR HIGH-GRADE AND RAPID REPAIR WORK ON POWER EQUIPMENT
FOR USSR INDUSTRIAL ENTERPRISES

(Editorial)

Large modern and technically advanced industrial and power enterprises have been built up in the Soviet Union at an unprecedented rate, and further progress is still being made. Soviet industry is today operating at a higher level of efficiency than before the war. Improvements both in quantity and quality are taking place all the time; new techniques, automatic machines, the mechanization of heavy industry, and the use of modern equipment are all playing their part in improving production and reducing costs.

The initiative and creative work of the Soviet people, manifested in the Bolshevik drive for the further development of our national economy, have revealed new reserves and resources for our socialist industry. The introduction of modern and advanced techniques has led to a completely new working routine. Each productive phase is now regulated according to a rigid work pattern. In these conditions, systematized operation and preventive maintenance on equipment constitute important factors in the continuous operation of machinery and the reduction of industrial costs in our socialist enterprises.

The system of rational operation and planned preventive maintenance for industrial equipment was first set up by Soviet scientists, engineers, and Stakhanovites and the resulting great contribution to the national economy has amply justified its use. This system could only be used in the Soviet Union, where the national economy is developed according to a fixed plan.

The planned preventive maintenance system for equipment consists of a series of measures for idling units, inspecting and repairing them, to prevent premature deterioration, breakdowns and unnecessary stoppages, and generally, to maintain machinery in first-class condition and constant operational readiness. Our leading enterprises have achieved considerable savings in labor and

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repair costs by introducing progressive technological methods and by mechanizing repair processes. Proper organization of repairs enabled these enterprises to maintain their electrical equipment in continuous operation and to increase their service life.

In the "Electrosila" Plant imeni S. M. Kirov, of the Ministry of Electrical Industry, an excellent system exists for the repair and servicing of electrical equipment, and time charts for inspection, preventive maintenance, and general overhaul are carefully kept for all machinery. Inspections are designed to reveal defects and eliminate small faults, such as badly connected or sagging leads, dirty contacts, breaks in the grounding system, faulty switches, and badly fastened protective covers. Data and results of each inspection are entered in a special ledger.

Preventive maintenance includes the changing of certain components such as bearings, switchboard leads, contacts, studs, and protective covers, the testing of wiring and grounding insulation, the checking of local lighting circuits, and other operations connected with the repair of technological and productive equipment. Information on preventive maintenance work is entered on data cards for each piece of equipment.

General overhauls of electrical equipment are carried out according to a specific plan based on the Ministry's over-all annual equipment repair plan. This takes into account the time the equipment has been operating, defects already made good during the operational period, and the probable wear and tear sustained during the year. The plan covers repair organization and techniques, the setting up of repair staging; the supply of spare parts, materials, instruments, and technical documents; mechanization and labor-saving methods, the use of rapid repair practices, the complete testing of repaired equipment, the instruction and training of repair personnel, the system of payment for work, and the use of mass-production methods and technology.

The Moscow "Serp i Molot" Plant, the Automobile Plant imeni Stalin, the Gorkiy Automobile Plant imeni Molotov, the Ural Machine-Building Plant, and many other leading enterprises have also made considerable progress in the repair of power equipment.

When repairing electrical equipment, it is most important that wide use be made of the latest technical achievements, the most advanced insulating materials (glass fiber, viniflex, heat-resistant synthetic coatings, insulating varnishes made from silicon organic compounds etc.), and new methods of drying, heating, testing, and control.

Periodical conferences of power engineers play an important part in promulgating the latest information on the repair of electrical equipment. A special scientific and technical conference on this subject was convened at the end of December 1949 to discuss the introduction of new electric machine construction techniques, new types of electric machines, and an analysis of breakdowns in electric machines and transformers. The following repair organizations gave details of their experience: Soyuzenergozemont (All-Union Power Equipment Repair Organization, Moscow Power Equipment Repair Organization, Bureau of Heavy Machine Repairs of the Ministry of Electrical Industry, Power Equipment Repair Trust, and others. The conference also discussed the need to increase the quality of insulation and to organize the rapid repair of electrical equipment. Resolutions taken at this conference will assist plant engineers to improve their repair organization and use the experience of the foremost repair services in their own enterprises.

When working out plans for the reconditioning of power equipment, all available information and theoretical material must be taken into account. For example, it is known that the most common defects in electrical machines are damaged

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stator windings (30-40%), damaged rotors (20-25%), and damaged exciters (25-30%). The remaining defects normally occur in bearings, excitation circuits, etc. An analysis of motor defects indicates that damage to the windings results from the following causes: two-phase operation due to absence of protection from overloading; increased humidity and dust content inside the premises; operation of electric motors in a high ambient temperature; unsatisfactory insulation; low quality of covering and impregnating varnishes.

Many enterprises have complained of the following: poor quality of Types PE and PEL enamel insulation for windings; poor quality of various varnishes, particularly Types 1154, 316, 319; unsatisfactory construction of starting devices; poor quality of contactors which do not make the necessary number of connections; poor quality of rheostats in which the resistors frequently burn out. There have also been many complaints about the unsatisfactory construction of Type RBA drives. The cover and casing of the drive are not tight and the engaging gear is badly made and often fails to connect. These and similar faults, together with the production of second-grade devices and mechanisms, have an adverse effect on the repair of equipment and lead to time losses and extra repair requirements. Our Soviet electrical industry, which produces the best electric machines and apparatus in the world, can and must eliminate these faults in the production of equipment and materials.

Power engineers have also submitted a number of requirements to the electrical industry, the most important of which are: organized mass production of complex high- and low-voltage distribution equipment, transformer and converter substation assemblies, capacitor assemblies, automatic and telematic devices, dry transformers with heat-resistant and noninflammable insulation, breakers for electric furnaces, socket and plug-type inertia cut outs, concentric stranded cable for high-frequency machines, motor driven meggers, active and reactive power meters, static capacitors, new types of electric motors, and apparatus and instruments for relay protection.

A more thorough inspection system to ensure that high-grade repairs are being made should be accompanied by well-organized and systematic instruction of servicing and repair personnel. In many enterprises, a special journal is kept in which inspectors of the Chief Engineer's Section note any infringement of the rules governing the operation and repair of power equipment. Suggestions for eliminating existing faults and improving repair work can also be inserted in this journal. These notes enable the repair services to evaluate the condition of equipment and to make spare parts and new material available in good time.

Periodical government inspections and the development of friendly socialist competition between operating and repair personnel play an important part in improving repair work. Basic changes in industrial equipment, and the ever-increasing importance of electrification, call for a corresponding improvement in repairs and operation, and in the economic indexes of the repair services. The planned preventive maintenance system must be further improved and such faults as unfulfilled norms for spare parts and overcomplicated records must be eliminated.

The system of planned periodical maintenance of power equipment should be based on the experience of the most advanced repair services and the widest promulgation of the most modern methods of operation and repair.

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